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Effective Leadership Styles in Hospital Laboratories

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Abstract **Introduction:** Effective leadership is essential to guaranteeing precise diagnosis, prompt results and top-notch patient care in the hectic and strictly controlled world of hospital laboratories. In addition to overseeing technical operations and compliance, laboratory leaders are also responsible for motivating and assisting interdisciplinary teams. Leadership styles must change along with healthcare. **Aims:** This study aims to investigate how task and relationship leadership styles affect the hospital labs. **Methods:** A variety of data collection techniques, including questionnaires, in-depth interviews, focus groups and non-participant observations, were used in a mixed method study with a sequential design. **Results:** Total number of ninety-nine (n = 99) Medical Laboratory Employees (MLS) (response rate: 66%) answered the leadership behavior questionnaire (LBQ) in the first phase of the quantitative data. In phase two, 96 hours were spent conducting in-depth interviews with 17 MLS selected through purposive sampling, conducting focus groups with 10 MLS in total and gathering observational data. Phase 1 showed that the two laboratories' MLS scores differed. In general, the qualitative findings' information supported and clarified the quantitative data's conclusions. Effective leadership, the effects of ineffective leadership and leadership problems on medical laboratory services were the three primary themes found in the phase two qualitative findings. **Conclusion:** The results revealed a range of leadership behavior scores, indicating the necessity of standardized management and leadership programs to ensure that all laboratories operate at the same high standard. The diversity of professionals, inadequate communication, collaboration and cultural concerns are just a few of the difficulties that the leaders of these medical laboratories must deal with.

Key Words Healthcare Leadership, Hospital Laboratory Management, Leadership Styles, Medical Laboratories, Health Services

INTRODUCTION

A key component of providing contemporary healthcare is the highly complex and specialized subject of medical laboratory science. Medical laboratory specialists have a crucial role in disease diagnosis, monitoring and prevention, although frequently operating in the background. Their work is complex because it involves the exact study of body fluids such as blood and tissues, which calls for critical thinking and in-depth scientific understanding in addition to technical proficiency. The field of medical laboratory science is highly demanding, involving a wide range of complex and multifaceted responsibilities that require precision, critical thinking and specialized expertise. Its function is to help medical personnel diagnose and treat patients as well as to help stop the spread of illness. The area of laboratory medicine is developing as a result of the many and multidimensional testing methodologies being used. Laboratory departments in hospitals are multifaceted, people driven systems that require strong leadership and effective management to ensure the provision of accurate, timely and reliable clinical test results [1]. The fact that laboratory test results are used to make the majority of medical choices shows how closely laboratory science is integrated into patient care. The accuracy and dependability of laboratory results are essential for every precise diagnosis, treatment strategy and follow-up. The information produced in the lab frequently dictates the direction of a patient's therapy, whether it is recognizing early signs of cancer, monitoring blood glucose levels in a diabetic patient or diagnosing a potentially fatal illness.

For clinical testing in medical laboratories to be accurate, dependable and timely, effective leadership is crucial. Leaders in this industry set the tone for a culture of accountability and quality, making sure that all procedures adhere to strict ethical and legal requirements. Leadership in medical laboratory science encompasses more than just overseeing daily operations; it also involves inspiring a common goal, encouraging employees and producing significant results. Good leaders give clear instructions, assisting lab teams in comprehending the goal and how their work affects patient care. They raise spirits, promote career advancement and uphold high standards even in the face of adversity by creating a cheerful and encouraging atmosphere. Teams that are motivated are more likely to maintain focus, pay close attention to details and react swiftly to clinical demands. In addition to improving everyday performance, leadership that synchronizes vision and action also improves diagnostic accuracy, expedites turnaround times and eventually improves patient outcomes.

In hospital laboratories, leaders are essential because they can inspire and motivate their subordinates to provide high-quality medical care. Laboratory managers have faced challenges in overseeing technical personnel and adhering to policies, standards and standard operating procedures. Leadership can be defined as the ability of a leader to provide a clear vision and effectively motivate followers to strive toward achieving specific goals [2]. It also encompasses the capacity to inspire ordinary individuals to produce extraordinary outcomes [3]. Consequently, leadership is not only essential in organizational contexts but also plays a fundamental role in everyday life. Yenice and Randell [4] identified five key roles of a clinical laboratory leader: demonstrating professional competency in practice; actively engaging in Quality Management (QM) processes; serving as an effective problem-solver and strategic thinker; continually seeking opportunities for improvement and excellence in service delivery; and driving the ongoing development and sustainability of laboratory services. The foundation of contemporary healthcare is medical laboratory science, which provides the vital information that influences diagnosis, therapy and recovery. Every reliable test result is the product of a team managed by capable leaders-experts who inspire excellence, maintain a clear vision and promote continuous progress in addition to managing systems and guaranteeing quality. Strong leadership enables labs to uphold high standards, react quickly to clinical requests and eventually enhance patient outcomes. The advancement of laboratory practice and patient care will continue to depend on the combination of scientific accuracy and strong leadership as healthcare continues to change.

MATERIALS AND METHODS

This study has employed a mixed-methods, sequential explanatory study design [5]. The purpose of using an explanatory sequential design was justified because it helped delineate the patterns and to measure the levels of laboratory leaders on the parameters and undertake comparative analysis with studies from around the world. The quantitative data provided by the questionnaires and made sense of through the qualitative data when exploring MLS' views on the leadership styles of their leaders [6].

The leadership style of the hospital laboratories was quantitatively measured using the Leadership Behaviour Questionnaire (LBQ) was developed by Northouse [7]. The questionnaire consists of 20 items. Each item of the questionnaire comprises a statement with a 5-point Likert scale. It has two leadership behaviour dimensions: people-oriented and task-oriented. This instrument has been used previously in a health setting [8], the reliability result was reported as 0.88 in a study of Mujtaba *et al.* [9]. This study has used observation data: Observational data were collected during this study in order to gain an insight into the hospital laboratories in terms of leadership in action [10]. In this case non-participant observation was adopted, this prevented the researcher's involvement from affecting interactions or communication [10,11]. The observation data in this study was descriptive in nature. The observation data in this study were not used as a distinct method of data collection, instead they were used to enhance the understanding of research context, to help reflect on the results and to assist in the interpretation of this study.

Using Focus Groups

The focus groups in the current study were used to gather a wealth of information on leadership behaviour within the hospital laboratory. According to Lederman [12], using focus groups rather than individual interviews has many advantages in terms of gaining a richer understanding of MLS' ideas. Focus groups also provided the opportunity to explore the topics concerned in more depth, thus more data was generated in a certain amount of time. This is important in a time limited study such as this [12].

Interviews

Interviews are one of the most important sources for qualitative data collection [13]. They provide flexibility which enables the researcher to add additional queries into the research subject in order to gain richer qualitative data. Interviews provided the researcher with access to personal experience, opinions and feelings about their roles [14,15]. Prompting questions were used in the interviews and these worked as a guide in gathering comparable qualitative data [16]. This type of interview is considered to be a foundation for the semi-structured approach as it allows flexibility and creativity to make sure that the views of respondents are gained [17].

Participants

This study was carried out in the city of Makkah in Saudi Arabia, included two laboratory hospitals. These hospitals are accredited by the Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) [18], funded and overseen by the MoH.

The inclusion criteria comprised all MLS staff working in the two medical laboratories, supervisors of departments and laboratory leaders, however, it excluded staff who had qualified with a Doctor of Medicine Degree (MD) and who were working as pathologists. A paper-based questionnaires were distributed to 150 MLS from the two SA laboratories, 99 were return with a response rate (66 percent) as per convenience sampling and willingness to participate in the research.

Regarding the focus groups, the researcher recruited ten Medical Laboratory Staff (MLS) to take part in focus groups, five members from each laboratory [19]. The strategy for recruiting the participants was as follows; those who met the inclusion criteria described previously and who had completed the first stage of this study (the survey). The researcher made sure to select participants with various experience, for example those with more than five years' experience and those with less. The sample size of 5 from each facility was chosen due to the qualitative nature of the research. A smaller group allow in depth discussion, direct interaction which may be used to explore the perception, attitude and experiences. It is also evident that the larger sample size can increase the diversity of viewpoints and previous researches suggest the saturation.

The in-depth interviews included laboratory leaders and supervisors of departments (two leaders, eight supervisors from both laboratories and seven MLS). Furthermore, the sample size for qualitative data is not always set in advance; the researcher simply needs to be able to justify their sample size [20]. In this study, the sample size for the qualitative data was limited by the number of laboratory leaders who were willing to be participants in face-to-face in-depth interviews.

Ethical Considerations

Ethics and Consent: The participation in study was voluntary with non-anonymous questionnaires collected to identify eligible participants for the qualitative phase. Then, the collected data form the qualitative phase transcribed and analysed anonymously. Informed Consent forms were obtained before collecting data with notes on type of research, aim, voluntary or willingness and non-willingness of participation, data confidentiality and privacy due to gender sensitivity. The potential benefits were also mentioned in the research instruments. Ethical permission to conduct the study was obtained from the committee of ethics in Saudi MoH through the Institutional Review Board (IRB) at the health affairs of the city of Makkah (Code No: H-02-K-076-1809).

Data Analysis

Data Analysis for Quantitative data: Descriptive statistical analyses were employed to describe, summarise and identify patterns in the data [21] related to the leadership behaviour of medical laboratory leaders. A t-test was applied to establish whether the means of the two laboratory groups exhibited any significant differences which could be associated with certain features [22]. Data Analysis for Qualitative data: Thematic analysis was undertaken using Braun and Clarke's six step approach to analyse the data of the observational, interviews, focus groups. Two software for data analysis utilized, for quantitative data the IBM SPSS Statistics Version 26 were use and for qualitative data analysis software NVivo 12 Pro for Windows.

RESULTS

Demographic Data

A summary of the data, frequency and percentages for the participants' characteristics are provided in Table 1.

Quantitative Result

Descriptive statistics of leadership behaviour's variables: For lab A, the mean of relationship-oriented leadership score was 25.08 (SD = 13.06), while for lab B the mean relationship-oriented leadership score was 36.98 (SD = 9.91). For lab A, the mean task-oriented leadership score was 26.53 (SD = 12.16), while for lab B, the mean task-oriented leadership score was 27.49 (SD = 9.88) (Figure 1). It is apparent that the leader in lab B scored higher than the leader of lab A.

Mean Comparison

A two-tailed independent samples t-test was conducted to examine whether the means of task-oriented leadership or relationship-oriented leadership were significantly different between lab A and lab B. The variances were consistently homogeneous, indicated by $p>0.05$ for Levene's test. The result of t-test for task-oriented leadership was significant, $t(97) = -4.91$, $p<0.001$. This finding suggests the mean of task-oriented leadership was significantly different between lab A and lab B. In addition, the result of t-test for relationship-oriented leadership was also significant, $t(97) = -5.14$, $p<0.001$.

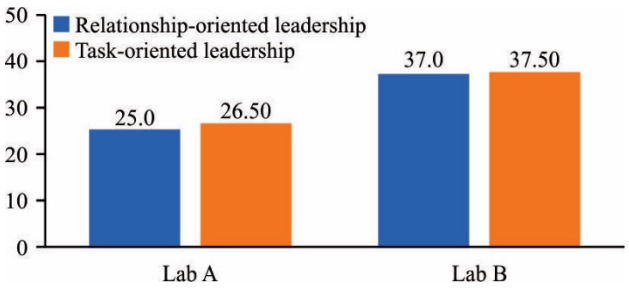

Figure 1: Mean Scores of Leadership Behavior for MLS in Both Laboratories

Table 1: Demographic Characteristics of the MLS (N = 99) From Two Sites

Characteristic	Category	Frequency	Percent
Years of experience	1-5 years	34	34.3%
	6-10 years	33	33.3%
	11-15 years	23	23.2%
	16-20 years	3	3.0%
	21-25 years	3	3.0%
	26 years or above	3	3.0%
Age	21-25	1	1.0%
	26-30	42	42.4%
	31-35	31	31.3%
	36-40	16	16.2%
	41-45	7	7.1%
	46-50	2	2.0%
Gender	Male	48	48.5%
	Female	51	51.5%
Profession	Medical technician	24	24.2%
	Medical technologist	68	68.7%
	Medical technologist I	7	7.1%
Educational Background	Higher health science diploma	19	19.2%
	Bachelor's degree	66	66.7%
	Master's degree	14	14.1%
Position at work	Normal staff	71	71.7%
	Senior staff	10	10.1%
	Supervisor	18	18.2%
Salary	3000-8000 SAR	7	7.1%
	8001-13000 SAR	62	62.6%
	13001-18000 SAR	25	25.3%
	18001-23000 SAR	4	4.0%
	above 23000 SAR	1	1.0%
Nationality	Saudi	96	97.0%
	Non-Saudi	3	3%

Table 2: Two-Tailed Independent Samples t-Test for Leadership Behavior Dimensions by Hospital Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
Parameters		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Task-oriented leadership	Equal variances assumed	2.496	0.117	-4.90	97	0.000	-10.965	2.234	-15.399	-6.532
	Equal variances not assumed			-4.67	66.75	0.000	-10.965	2.343	-15.643	-6.288
Relationship-oriented leadership	Equal variances assumed	3.889	0.051	-5.13	97	0.000	-11.905	2.318	-16.505	-7.304
	Equal variances not assumed			-4.82	63.29	0.000	-11.905	2.469	-16.839	-6.971

This finding suggests the mean of relationship-oriented leadership was significantly different between the two laboratories (Table 2, 3).

DISCUSSIONS

The qualitative findings generally aligned with and provided deeper insight into, the quantitative results. Notably, the leader of Laboratory B exhibited a commendable level of people-oriented leadership. Participants in the study highlighted the leader's strong interpersonal and communication skills, which were seen as key factors contributing to effective team dynamics and overall staff satisfaction. These qualitative insights help to contextualize the quantitative outcomes, reinforcing the importance of people-focused leadership in laboratory settings. Weiss [23] found these qualities as important for laboratory leaders. Interpersonal skills play a key role in enhancing the understanding among MLS, as well as producing more effective communication [24]. Interpersonal skills are fundamental to fostering strong relationships between leaders and their team members, characterized by trust, honesty and mutual respect. In the context of medical laboratory services-where much of the work occurs behind the scenes and MLS professionals often have limited interaction with external stakeholders-a supportive and positive work environment becomes especially important. People-oriented leadership plays a crucial role in cultivating such environments by promoting collaboration, open communication and emotional well-being among staff. As noted by Bishop *et al.* [25], leaders who prioritize interpersonal relationships contribute significantly to creating a positive organizational climate conducive to both employee satisfaction and performance. Active listening was another important aspect of interpersonal skills favoured by MLS in the medical laboratory. Active listening is a form of communication and it indicates that the leader has effective communications in the workplace [26]. Effective communications promise excellent services [27]. The

Table 3: Major Themes and Sub-Themes Linked with Leadership Behaviors of the Hospital Laboratories

Main themes	Sub-themes	Quotes
Effective leadership	Interpersonal relationships	"I see that he is close to us and humble, he opens his channels and doors to us … There are debate and discussion areas and open doors there is no room to repel." [Participant MLS (14)]
	Involving staff in decision making	"This is a big mistake to annoy your employees based on your decision." [Participant MLS (4)]
	Building an effective team	"I think the most beneficial aspect of leadership is to develop good teamwork, if you build a harmonious and homogeneous team and distribute tasks and functions as required, I think success will follow." [Participant MLS (1)]
Ineffective leadership	Lack of delegation authority	"The distribution of power is unbelievable in our laboratory; the whole laboratory is controlled by one person." [Participant MLS (4)]
	Lack of support	"That means if someone complains from any department in the hospital or any doctor, the laboratories' management does not defend me or stand with me or with us". [Participant MLS (5)]
	Poor management and leadership role	"Leadership does not mean that a leader listens and does what top managers of the hospital order him to do, no. A leader is the one who is really creative, discusses everything before he/she turns back to his/her staff. A leader should listen from the top, understand what they really want and at the same time think deeply for the sake of staff. Is this order for or against my staff? Is this going to create a good environment or not? This is the role of the leader. But leadership now is not like that." [Participant MLS (13)]
Leadership challenges	Cultural challenges	"There other are people did not want to communicate with me verbally because I am a woman, I tried to make WhatsApp groups and Telegrams but above all of these, some of them still did not want to communicate." [Participant MLS (11)]
	Multiplicity of professional specialisations and	"The main challenge facing any leader in a laboratory of the Ministry of Health is the multiplicity of professional specialities. We have workers who come from different backgrounds." [Participant MLS (1)]
	The challenges of quality	"Participant: the tasks of quality do not exist in the job description of the ministry. Researcher: does the laboratory manager have the authority to add policies he thinks appropriate? Participant: we are working on it now." [Participant MLS (2)]

findings of this study indicated that the leader of lab B who has higher leadership qualities, MLS were able to visit the leader's office at any time to discuss ideas or concerns, they felt this was important. In addition, the researcher noticed that during observations, the door of the leader's office was usually open and staff members were present. The advantage of active listening is that it makes followers feel accepted and appreciated, this establishes a positive workplace environment [28]. Whereas the leader of lab A who has low leadership qualities rarely listening to followers. This action can make MLS feel excluded or that they are not valued members of staff and this may reduce the level of job satisfaction [29].

Involving MLS in decision-making is a sign of a relationship-oriented leadership style [24]. The qualitative data of the current study showed that the leader who exhibited low scores on relationship-oriented style was rarely involved staff in decision-making. Lack of involving staff in decision making could affect the collaboration and cooperation between the leader and staff and also between the staff members themselves in a way made them less responsive to changes [30]. The absence of people-oriented leadership qualities in lab A may impact the welfare of every single employee; this event had a negative effect on the leadership and working relationships [24]. Whilst involving MLS in decision-making would have strengthened the quality of the relationship between leaders and staff.

Building an effective team was another leadership quality mentioned by the participants of the current study. Data analysis also revealed that the leader who exhibited higher leadership qualities was aware of the benefits of building an effective team in the workplace. During observations, the researcher noticed that these MLS' were more sociable, had good relationships and arranging a celebration for their colleague. These things were rare to observe in the laboratory where low leadership qualities were exhibited. This could be explained as the people-oriented leaders are aware that productivity requires effective team building and a positive environment where staff feel motivated [25].

The qualitative data from the current study indicated that laboratory leaders demonstrated certain characteristics of a task-oriented leadership style. Specifically, participants reported that the delegation of authority and systematic distribution of tasks were evident, particularly in the laboratory led by a leader perceived to possess stronger leadership qualities. This suggests that effective task-oriented leadership, marked by clear role assignments and operational efficiency, played a role in enhancing team coordination and overall performance. When authority delegation is missing, this means the communication between the leader and MLS in the laboratory was poor, thus trust, credibility and willingness to cooperate were also decreased [26]. In addition, failure to delegate authority may lead to duties not being completed in a timely and productive manner [31].

The data analysis also suggests that failing to delegate authority to departmental supervisors may lead to inhibit staff creativity. Because they feel that the leader is controlling them constantly. The leader who exhibited high leadership qualities was supportive of staff ideas and opened dialogues to discuss and develop them, this approach is likely to lead to greater improvement and success. Furthermore, Riisgaard *et al.* [32] stated that delegating authority was an effective tool when a leader allowed a team or a staff member the freedom and creativity to accomplish organisational goals.

An emerging sub-theme was identified in this study, this was in relation to poor management and a weaker leadership style. Globally, the context of healthcare services is continually changing and becoming more complex. It is vitally important that a leader is able to recognise the differences between leadership and management tasks and duties. Leaders with clear plans and visions will help to successfully lead the workplace and reach its goal [4]. It is suggested that regular communications can help achieve the workplace's vision [33], however, communications skills presented weak especially in lab A as shown in this study. Management tasks could be delegated to other staff to encourage good leadership. Leaders also need to have a sound understanding of the workplace in order to develop the employees and the workplace as was shown in the current study.

Data analysis revealed that leaders of both laboratories have weak support from the MoH in terms of workshops about leadership and management. This means leaders need to develop themselves. Yenice and Randell [4] stated that laboratory leaders need to be supported to determine their leadership strengths and find ways to develop them. If there are weak supports provided to those laboratory leaders as shown in this study, the availability of certain criteria could help in selection leaders meet the expectation of staff and workplace. Aldawood [34] conducted a study on nursing leadership in SA believed that the selection of leaders must follow clear criteria and at the very least the person should have appropriate skills and personality traits. Appointing leaders with little knowledge of rules and policies may lead to a poorly functioning workplace.

The topic 'multiplicity of professionals' was discussed extensively by participants. The findings indicated that this was a challenge for leaders in both laboratories. Staff employed in the laboratory held a wide variety of professional qualifications depending on their specialisation. However, this had a negative impact on the leaders of hospital laboratories. This is because, in SA, there is a lack of role clarity as the roles of technologists (scientists) and technicians are almost identical at the laboratories included in this study. In addition, the inappropriate preparation for the graduates of chemistry and biology who want to become professionals. In SA, the graduates of chemistry and biology require to do one year training (placement) in a medical laboratory and then the exam to be classified as medical technicians [35]. Indeed, the purpose of this training is to get the skills of doing tests and operating the machines.

Data analysis also revealed the reaction of both laboratory leaders towards the lack of role clarity. Leaders who have high leadership qualities worked on defining the roles and set tasks for MLS. However, the leader who exhibited low leadership qualities did not address this problem. The reason for this could be that the leader was aware of the roles of his staff but did not find it necessary to clarify it for them. As a result, the leader who exhibited low leadership qualities did not exhibit clear qualities of task-oriented leadership style. A task-oriented leader must be precise when delivering information to followers through constant communications to ensure targets are clearly understood [36].

Communication was one of the major challenges for laboratory leaders due to the SA culture and society. Despite the openness and huge changes in SA culture, communication with the opposite gender remains difficult. This could be attributed to the imposition of gender segregation through religion, community power and cultural influences within SA. Women are not permitted to communicate without a reason or work with men; they are not a relative in blood in most settings, especially in a healthcare context. The Saudi Arabian community prefers to separate gender at all life stages, this includes education, health services and the workplace environment [37]. It is not surprising, therefore, that communication barriers exist between males and females due to cultural values and religious boundaries.

Some challenges were identified in this study, these were in the areas of quality. A leader who achieves high scores for both leadership styles, people-oriented and task-oriented, should be able to overcome these challenges with ease. The findings revealed that leaders who exhibited high leadership qualities, the laboratory had achieved three accreditation certificates for healthcare quality and patient safety whilst the second laboratory has only received accreditation recently. This can be explained by people-oriented leaders being focused on supporting, motivating and developing their employees and task-oriented being focused on achieving goals in an accurate time manner [24]. Therefore, the team was more productive and willing to take risks, they were confident that the leader would support them if required as was the case in lab B [24].

Implication and Recommendations

The COVID-19 pandemic has highlighted the critical role of Medical Laboratory Scientists (MLS) as essential members of multidisciplinary healthcare teams working to combat the spread of the disease [38]. Their efforts underscore the importance of strong leadership within hospital laboratories, which must be enhanced to meet the evolving needs of healthcare services and staff. The challenges faced during the pandemic serve as a compelling call to action for health ministries, organizations and regulatory agencies to prioritize leadership development. A standardized and comprehensive leadership and management program is essential to ensure that laboratory leaders across all institutions are equipped with the necessary skills and knowledge. Such an initiative would promote consistency, efficiency and high performance across hospital laboratories nationwide.

Further research is also needed to investigate the discussed leadership styles in this study as well as other

leadership styles. It is also suggested to examine the impact of leadership styles, such as authentic and servant styles (while authentic style increase the trust, genuineness and credibility, at the same time servant style fosters a sense of psychological safety), on the quality of testing in hospital laboratories. Gender segregation is one example of a cultural barrier that might restrict cooperation and inclusion. By encouraging equity, teaching adaptive communication and cultivating cultural sensitivity, leadership training aids in navigating issues. Multi methods of training can be offered to the participants like e-learning, blended learning, on-job training, in person seminars and to assess the impact of the same, post training evaluation method can be employed like post training assessment etc. Sometimes funding, time limitations and resistance to change is the main constraint.

CONCLUSIONS

Leadership plays a critical role in the effective delivery of laboratory services. Hospital laboratories are composed of a diverse range of professionals, including pathologists, medical scientists, managers and supervisors, all of whom contribute to leadership in different capacities. Effective leadership fosters teamwork, drives motivation and facilitates clear communication of goals and expectations. Leaders in laboratory settings not only provide direction but also inspire their teams and create an environment conducive to continuous improvement. By actively participating in multidisciplinary teams, they can significantly enhance service quality and operational efficiency. Among various leadership approaches, two styles- transformational and transactional leadership- are particularly relevant and can be effectively applied within hospital laboratory environments to strengthen performance and outcomes. The study concluded that standardized leadership and management programs are needed to ensure consistent quality across laboratories. Leadership challenges included professional diversity, poor communication, limited collaboration and cultural issues.

Limitations

The Limited number of experienced participants.

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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